

BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET No. 2021-66-A

IN RE: South Carolina Office of Regulatory Staff's)	REPLY COMMENTS BY CAROLINAS
Motion to Solicit Comments from Utilities and Other)	CLEAN ENERGY BUSINESS ASSOCIATION
Interested Stakeholders Regarding Measures to Be)	
Taken to Mitigate Impact of Threats to Safe and)	
Reliable Utility Service)	

The Carolinas Clean Energy Business Association (“CCEBA”) files these comments to reply to the original comments of Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP”) (collectively “Duke”) and Dominion Energy South Carolina, Incorporated (“DESC”). Rather than a comprehensive response to the Commission’s questions set forth in the March 10, 2021 Directive Order 2021-163, CCEBA submits these Reply Comments to address certain issues raised by Duke and DESC.

The Commission’s Directive Order 2021-163 sought input on the following:

- Identification of Threats to Utility Service
- Identification of Impacts to Utility Service
- Assessment of Vulnerabilities
- Assessments of Risks to Utility Service
- Identification of Resiliency Solutions
- Identification Other Federal and State Reliability Requirements
- An Assessment of Current Utility Processes and Systems to Withstand Potential Ice Storms and other Winter Weather Conditions
- Identification of Best Practices, Lessons Learned and Challenges to Utility Service

Both Duke and DESC provided substantial information in response to each of these areas of inquiry, and CCEBA does not express an opinion as to the assessments by each utility of the physical risk of extreme weather events, the utilities' readiness for storms, or responsiveness to such conditions. Rather, CCEBA wishes to respond to statements by each utility regarding the February 2021 ERCOT disaster in Texas, particularly assertions by the utilities as to the role played by renewable resources and market reforms in that disaster.

(1) Assumptions by Duke and DESC that Wholesale Competition in Texas Led to the Conditions of the ERCOT Disaster are Unwarranted and Market Reform Determination is Being Considered in a Legislative Forum.

Duke states in its initial comments that “[t]he current regulatory construct and market structure has resulted in an electricity system with rates consistently below the national average and an excellent track record of reliable service and responsiveness to extreme weather events.” (Duke Comments at 3.) Duke attributes this readiness at least in part to its integrated monopoly structure from generation to the customer meter. Duke then contrasts its stated performance with the “deregulated and restructured utility models, such as in Texas and California” where Duke claims “system operations are not integrated across many of the functions outlined above as they are in South Carolina.” (Id. at 4.) States Duke, “As was seen in the Texas Blackout and the August 2020 Western Heatwave Event (the “California Blackout”), the consequences of not planning, investing, and operating as an integrated electric system with a high degree of accountability can be significant and have devastating impacts on customers.” (Id.)

DESC likewise asserts that market structure determined the Texas events. “In deregulating its electricity sector, Texas replaced vertical integrated utilities with a system of day-ahead and real-time electricity markets and unregulated power producers. The state allowed its policies to evolve in ways that eroded the incentives for generation owners to invest in reliability and resiliency... Under the stress of extreme weather, Texas’s regulatory policies and generating units and gas supply failed its people with disastrous results.” (DESC Comments at 4.)

The reasons behind the ERCOT disaster in Texas are many and the true causes are still being discussed and analyzed. ERCOT's April 27, 2021 presentation evaluating the causes of the outages and derates that affected its system is attached hereto as Exhibit A. The charts and analyses in that document note that weather conditions, fuel limitations and equipment problems posed the bulk of the challenges to generation during the week of the Texas storms, and while wind and coal were certainly affected, the bulk of the outages and estimated lost output occurred at natural gas plants. (See Exhibit A at 4, 16.)

Duke and DESC's attribution of those physical causes to the market-based approach of the ERCOT system and its assertion that their own vertically-integrated monopoly structure is superior in comparison are gross and misleading overgeneralizations. It is not necessarily the *structure* of the system which causes the difference, but the *actions* of the players in each system. Duke is regulated by active and knowledgeable state commissions in North and South Carolina. In exchange for strictly limited competition, the states *require* the kind of preparation and responsiveness to public need that the utilities trumpet in their responses. Just as there is nothing inherent in that system that would necessarily result in Duke and DESC fulfilling their duties without rigorous and disciplined oversight, there is nothing inherent in the ERCOT system that would necessarily lead to the disaster in February 2021. Rather, lax administration combined with specific market structures that failed to incentivize equipment winterization and contingency planning, along with unclear lines of communication, combined with 1-in-50-year weather to nearly bring down the ERCOT grid entirely. A more fulsome analysis of the precursor conditions is provided by the International Association of Energy Economics ("IAEE") in its report attached as Exhibit B.

The IAEE report addresses the effect of Texas's unique market structure -- i.e., *retail* competition -- on the lines of communication and economic incentives for preparation and evaluates the performance of grid controllers during the multi-day disaster. The report also examines the performance

of participants in ERCOT's *wholesale* generation market and found "a wide range of performance with respect to outages and, implicitly, underlying portfolios and management practices. In general, *the resource entities that remain fully regulated performed less well* even excluding a strong outlier."

(Exhibit B at 4) (emphasis added.)

Moreover, the regulated monopoly structure lionized by Duke and DESC in their comments itself contains economic incentives that can distort development of a cost-effective, resilient grid. In 2019, Duke submitted its South Carolina Grid Improvement Plan to this Commission, detailing \$454.5 million in capital spending over three years in 18 different programs. Attached as Exhibit C is a January 31, 2019 report from GridLab entitled "Modernizing the Grid in the Public Interest: Getting a Smarter Grid at the Least Cost for South Carolina Customers" ("the GridLab Report"). In addition to a general discussion of various options for improvement of the electrical grid in a state with incumbent operating utilities that enjoy regulated monopoly status, the GridLab Report evaluates the 2019 Duke Energy Grid Improvement Plan, identifying "critical omissions," including understatement of costs by "at least 50%." (Exhibit C at 17-23.)

The GridLab Report notes that fundamental utility compensation reform may be necessary, in order to eliminate capital bias and throughput incentive, which incentivize regulated monopoly utilities such as Duke and DESC to invest more heavily in their grid than necessary while minimizing energy conservation opportunities and discouraging deployment of distributed energy resources ("DER"). GridLab notes "[a]s regulators and stakeholders have neither the technical expertise nor the resources required to rigorously evaluate utility's technical arguments for grid investments, a regulatory model which eliminates capital bias may be warranted. As customers become more interested in conservation and self-generation, the throughput incentive must also be addressed." (Id. at 26.)

These concerns are echoed in a paper prepared by the Nicholas Institute for Environmental Policy Solutions at Duke University evaluating the potential for market reform and regional transmission

organizations in current regulated monopoly jurisdictions. (Jennifer Chen, "Evaluating Options for Enhancing Wholesale Competition and Implications for the Southeastern United States," attached as Exhibit D.) After evaluating many potential options, including the participation of vertically-integrated utilities in RTOs, the report concludes in part:

If a vertically integrated utility joins an RTO, special care must be taken to ensure that the utility does not have incentives to finance unnecessary investments through customers in order to make a profit through the markets. Even if the customers share in the profits, doing so converts them into involuntary shareholders. For example, Dominion's ability to profit from sales to the energy market could encourage the utility to build more than what it needs to serve its customers.

(Exhibit D at 31.)

It deserves mentioning that even with the current regulated monopoly structure in South Carolina, DESC's predecessor South Carolina Electric & Gas Co. experienced rolling blackouts during the Polar Vortex of 2014 – a failure to meet load that resulted not just from cold weather, but due to the company's fossil fuel stations experiencing forced outages when most needed. As testified to at the time, the South Carolina outages sound very like those which cascaded to disaster in Texas:

So when we talk about our combined-cycles at Urquhart, 16 Units 6 and 2 is the combined-cycle plant. We had some problems with Unit 2, but we were able to get 18 Unit 6 on-line. Those were not weather-related 19 problems. They weren't caused by the cold weather. Then on January 7th, in the wee hours of the 21 morning, a little after 2 a.m., we did lose Urquhart Units 5 and 1 -- it automatically shut down; in our parlance, we would say the plant tripped, or tripped off-line -- which is about 242 megawatts.

And then on January 7th, the day in question, 2 at about 6:21 a.m. -- which is about the worst time possible for a plant to come off-line, because load is building in at this point in time -- we lost our Williams unit, which is a coal facility near Charleston, and that is 610 megawatts

(Tr. of Allowable *Ex Parte* Briefing, Docket No. 2014-3-E, Hearing #14-11408, at pp. 14; 14 - 15; 6.)

If Duke and DESC were right about their preferred regulatory structure being a panacea for reliability, this event would not have happened. But it did happen, and the reasons it happened are

manifold (though they center on fossil fuel stations failing to operate) – just as the reasons for the Texas situation are manifold (though they center on fossil fuel stations failing to operate).

In sum, the effect of market and regulatory structure on both the Texas disaster and future conditions in South Carolina is not so simple and straightforward as stated by the utilities in their initial comments. Fortunately, a forum for the consideration of those issues in detail and at length exists. The potential for reform of the market and regulatory structure of the South Carolina electric power system is the subject of a Legislative Study Committee that is just beginning its work. This market reform study process will evaluate the costs and benefits of such reforms and will include input from over 40 representatives from a broad array of stakeholders, including the utilities. CCEBA respectfully submits that arguments for the maintenance of the monopoly enjoyed by Duke and DESC in their respective service areas are not the proper focus of this docket, which should rather be focused on the physical readiness of the current power generation, transmission, and distribution systems to withstand catastrophic events and the nature of the utilities' plans to react to and recover from such events. At this time, market reform and regulatory structure is properly being addressed by the Legislative Study Committee and the General Assembly.

(2) Duke and DESC's Attribution of Capacity and Resiliency Risk to Renewable Resources is Not Supported.

In its initial comments, Duke discusses the California Blackouts of August 2020, and states that "The solar panels that replaced much of the retired dispatchable and baseload gas (and soon nuclear) resources could not meet customer needs while the sun was setting, as imports were constrained due to the widespread nature of the heatwave." (Duke Comments at 5.) Duke later identifies nondispatchable intermittent renewables as a "threat" to the bulk (>100kV) electrical system noting that "on a cloudy day or if the solar panels are covered with snow and ice, the output of a 100 MW rated solar facility may only generate 2 to 5 MW at its peak output for the day." (Id. at 24.)

In noting these conditions and threats, Duke fails to account for the conditions in California that led to the decrease in solar performance. Namely, unprecedented massive wildfires that blanketed the region in thick smoke. Further, in noting that cloudy conditions or ice and snow hamper the performance of solar resources, Duke evidently did consult ERCOT's own assessment of which generators were affected by the events of 2021, which shows that *gas units suffered substantially greater declines from expected capacity than solar or wind*. (Exhibit A at 16.) Duke's analysis, in short, suffers from the same misapprehension of solar capacity as affected the proposed IRPs rejected by this Commission.

DESC, after acknowledging its duty to lower carbon emissions and transition to new sources of power generation, states that "the single greatest resiliency concern for the generation system today is gas supply" (DESC Comments at 23), but notes that "[u]nfortunately, solar generation can provide little meaningful reliability support for winter peak demands, since those peak demands occur in early morning hours when solar is not able to generate significant quantities of power. . . . Solar plus storage capacity can also provide only limited resiliency value since batteries are typically sized to provide only four hours of energy without recharge." (Id.) DESC, however, has *no* battery storage on its system at all. (Id.)

As they did in their respective IRPs, DESC and Duke miss the symbiotic capacity effect that storage resources have on solar generation. Researchers at NC State University and NC Central University recently published the results of a modeling study which looked at the North and South Carolina power system and modeled the effect of solar and storage on generation capacity. (See Exhibit E, June 17, 2021 "Combining Energy Storage and Solar Offers Unexpected Power Reliability Boost" <https://news.ncsu.edu/2021/06/energy-storage-and-solar/> (Accessed June 24, 2021), citing Daniel Sedano, et al., "The Symbiotic Relationship of Solar Power and Energy Storage in Providing Capacity

Value,” *Renewable Energy*, Vol. 177, Nov 2021, pp 823-832 (content available at

<https://doi.org/10.1016/j.renene.2021.05.122>.)

The researchers “built computational models to assess how much power a system could expect from different sources during periods of peak energy demand.” (Id.) The researchers found that “[w]hen a system combines solar and energy storage, that combination can be relied upon to provide up to 40 percent more power during peak demand than if you just added the output from each source.” (Id.)

This finding is consistent with testimony provided to this Commission during the April hearing on the Duke Energy Integrated Resource Plans. CCEBA witness Kevin Lucas testified that deployment of storage with solar improved the capacity contribution of solar. “[I]t can help firm the solar resource. It can smooth out some of those small intermittent changes that might happen as a cloud crosses. *But it also helps firm up the capacity contribution by making sure that that energy is available potentially later in the day.* So as the storage is added to the system, more and more value is going to be available from this.” (Docket Nos. 2019-224-E and 2019-225-E: South Carolina Energy Freedom Act (house Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Duke Energy Carolinas, LLC & Duke Energy Progress, LLC (“Duke IRP Hearing”), Tr. p. 1927, 13-20.)

Witness Arne Olson of E3 also testified to the resiliency benefits of having a broad portfolio of resources that includes battery storage to assist the South Carolina and North Carolina grids in winter peak events. This is particularly true, Olson stated, in circumstances like a one-week cold weather event in South Carolina in 2014:

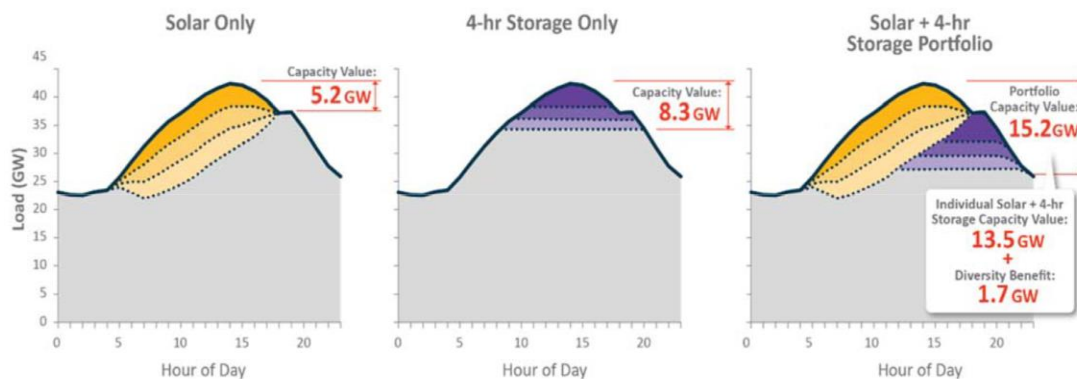
batteries could provide a portion of the capacity that's needed on the Duke system. So they could be a significant contributor to reliability even though in these wintertime days, even if they only had 4 hours of duration, and even if they don't have solar to charge from. And that's what the Astrape studies, in fact, found is that 4-hour battery storage -- even with this economic arbitrage mode that they were running them in still had 90 percent reliability as compared to their nameplate with all these wintertime events. So storage can be a significant contributor even if solar can't on these wintertime events.

(Duke IRP Hearing Tr. p. 1891.)

Olson testified that there is a need to prepare not only for winter events, but for loss of load events in summer months as well. There is a “need for a portfolio of resources to maintain reliability and not just during that one week that we saw but during other periods that might have high loads where you might have higher loads on your neighbor's system or you might not, so you might be able to buy some power from your neighbors. And there might be high load events during the summertime as well.” (Id. at 1889.)

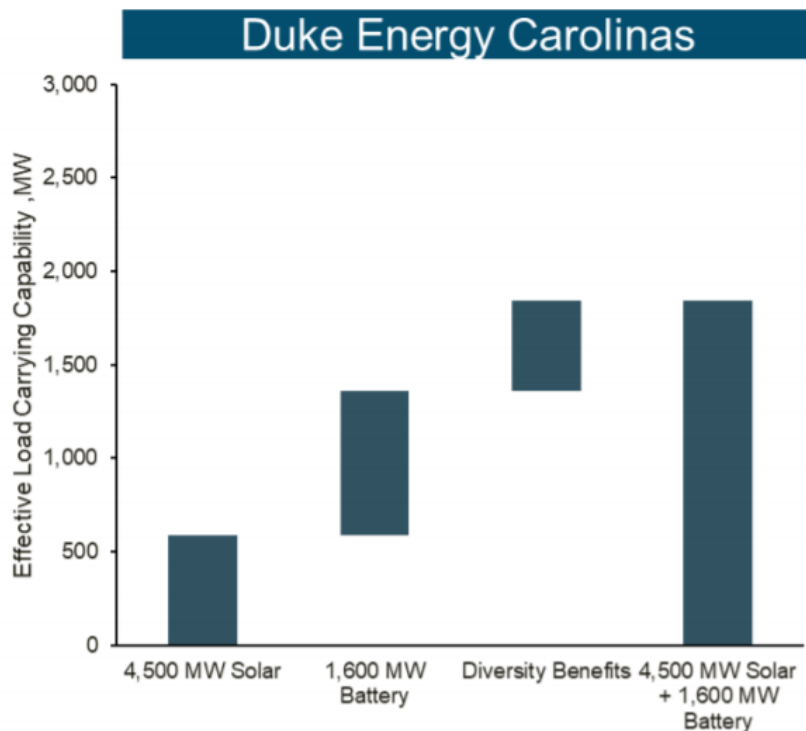
Olson explained this “diversity benefit” of storage and solar as follows: “solar shifts and narrows the net peak, which is then shorter in duration and can be more effectively met by storage. This interaction is a diversity benefit arising from the interaction of the resources versus other resource additions.” (Duke IRP Hearing, Prepared Test. of Arne Olson at p. 11.) Olson demonstrated this effect with two charts:

Figure 1: Illustration of the Synergistic Effects of Solar and Storage



(Id. at 10.)

Figure 2: Quantification of ELCC and Diversity Benefits from Solar and a 4-hour Storage Device



(Id. at 18.)

Advanced Energy Economy (AEE) provided comments on April 15, 2021 to the Federal Energy Regulatory Commission in that body's Climate Change, Extreme Weather, and Electric System Reliability docket (Docket No. AD21-13-00), attached as Exhibit F. Those comments examined the role played by DER, including solar plus storage, in recent disasters. Citing the example of fire stations in Puerto Rico outfitted with solar plus storage systems that were able avoid widespread outages and continue operation after Hurricane Maria (Id. at 7), AEE stated:

[w]ith the advent and growth of distributed battery storage, the potential for distributed energy resource facilities to bolster the resilience of the grid and of individual critical loads and public safety facilities is a current reality... DER facilities could be utilized to provide system-level peak capacity and ramping services; fast-responding dispatch filling the island's critical need for spinning reserves; automated inverter-based response to frequency deviations; peak capacity in transmission constrained areas; peak capacity on the distribution grid to reduce strain or the need for

capacity expansion; voltage management on the distribution system; and neighborhood and site-level resiliency.

(Id.)

CCEBA recommends AEE's entire filing to this Commission as a detailed and comprehensive consideration of the role of DER and renewable resources in grid resiliency, as well as an assessment of the increased risks of climate change and severe weather-related events to the electrical grid.

While Duke and DESC focus their comments on the difficulties they face in integrating third party generated renewables and DER into their existing monopoly-built systems, ample evidence exists that such resources in fact *benefit* a power system. Solar resources, when risk, cost, and performance of newer tracking systems are included, offer reliable power generation not dependent on the price of a fuel supply or the integrity of a pipeline. Storage, when paired with Solar or Wind, offers dispatchability, quick ramp up, and the diversity benefit mentioned above.

(3) Conclusion

CCEBA appreciates the opportunity to comment on these important issues in this resiliency docket. It is imperative that in evaluating the readiness of South Carolina's power grid to respond to catastrophic events such as hurricanes or the winter storms in Texas in 2021, this Commission should take note of the incumbent utilities' tendency to confuse the issues. Market reform is the subject of other proceedings, and the utilities arguments to the contrary, such reform efforts are not determinative of this state's current resiliency status. Nor should the utilities' misrepresentation of the events in Texas and California undermine South Carolina's transition towards increased deployment of affordable and reliable renewable generation. This Commission has upheld the importance of that transition in its recent rulings on Duke and DESC's IRP filings. CCEBA urges the Commission to continue that focus in this docket as well.

Respectfully submitted, this 25th day of June, 2021.

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